

Express Mail Label No. ET318111314US  
Date of Deposit: August 21, 2003

Attorney Docket No. 25739-026

**APPLICATION**

**FOR**

**UNITED STATES LETTERS PATENT**

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**SPECIFICATION**

TO ALL WHOM IT MAY CONCERN:

Be it known that **James M. Leventhal** has an invention entitled **FLUID DISPENSING DEVICE** of which the following description in connection with the accompanying figures is a specification.

## FLUID DISPENSING DEVICE

### CLAIM OF PRIORITY TO PRIOR APPLICATIONS

This application claims priority under 35 U.S.C. § 119(e) to United States provisional application Serial No. 60/405,009, filed on August 21, 2002, which is  
10 incorporated herein by reference.

### FIELD OF THE INVENTION

The present invention relates generally to devices for dispensing a fluid spray or mist. More particularly, the invention provides a portable, cordless fluid spraying or  
15 misting device configured as a brush.

### BACKGROUND OF THE INVENTION

Hairbrushes generally and round hairbrushes specifically are used to style, smooth and detangle hair. A conventional hairbrush typically includes a handle at its proximal end  
20 and at its distal end a portion to hold a plurality of bristles. The proximal end of the brush is often a shaped handle and is constructed of any one or a combination of materials. The distal end is often shaped, for instance, as a round or paddle-like conformation, and is similarly constructed of any one or a combination of materials. Bristles can be constructed of synthetic materials, as well as natural materials and fibers. The length and the  
25 distribution of bristles of a brush can vary widely, depending on the type of hairbrush design, the aesthetic appeal sought, or the styling effect desired.

5 Hairbrushes are generally used in a hair styling process and are often used in  
conjunction with water or other hair products to achieve a desired styling effect. Dry hair  
is often difficult to style with a hairbrush and can be more easily styled when it is wet.  
Therefore, adding water to a hair styling process can ease styling and can be beneficial in  
terms of achieving a desired effect, reducing the amount of time required and the materials  
10 necessary to style hair.

For these reasons, many people prefer to style their hair when it is wet, styling hair  
after bathing and/or adding water to their hair during a styling process. Adding water to  
hair can include, for instance, manually applying water to hair or spraying water from a  
portable, pump-action spray bottle. Applying water manually or from a spray bottle during  
15 a styling process, while brushing and styling hair with a brush and/or a blow dryer, often  
requires substantial manual finesse. Typically, moistening hair and styling hair with a  
brush are steps performed separately and repeated many times until hair is adequately  
moistened and styled in a desired fashion. For many people, this process is difficult.

Traveling with hairbrushes and a portable spray bottle can be cumbersome. In  
20 addition, use of hairbrushes and a portable spray bottle to style hair away from home or in  
a public restroom can be inconvenient. In particular, in the work place, people are likely to  
prefer a discreet means of brushing and styling their hair when necessary.

Thus, a means of conveniently, discreetly, and quickly moistening hair while  
styling hair without drawing attention to one is desirable.

25 Prior art hairbrush designs provide methods for moistening and brushing hair  
including a liquid dispensing hairbrush disclosed in U.S. Patent 5,927,290. The liquid  
dispensing hairbrush includes a spray mechanism that allows a user to spray a liquid from

5 a bristle area of the hairbrush. This device requires a user to coordinate multiple manual pumping actions of the spray mechanism with multiple manual hairstyling, e.g., brushing, actions, while requiring the user to aim the spray mechanism at a desired area of hair.

U.S. Patent 5,909,737 discloses a combination brush and hairspray system for allowing a user to simultaneously brush and apply hairspray to their hair using only one  
10 hand. The combination includes a fluid chamber connected to a plurality of delivery tubes operatively connected to a pump.

The devices disclosed in U.S. Patents 5,927,290 and 5,909,737 include a short trigger mechanism that permits the device to deliver a small volume, and often a heavy flow or ration, of fluid from a reservoir. In many instances, the device potentially delivers  
15 either too little fluid or water and the effect is counter-productive, or too much fluid or water at one location that produces messy results. In addition, the short trigger mechanism requires a user to pump the trigger many times or repeatedly during a styling process, which action, as noted, can be ineffective and ultimately can be tiresome.

A device disclosed in U.S. Patent 5,746,531 is configured to store and to dispense  
20 fluid from a proximal end of a hairbrush handle, rather than from a portion of the brush containing bristles. A user of this device is not able to simultaneously spray their hair with a fluid or water while brushing their hair.

U.S. Patents 6,158,442 and 6,276,367 disclose hairbrush devices that store fluid in a head of a hairbrush and dispense the fluid from tips of each or several of a plurality of  
25 bristles that is connected at a distal end of the hairbrush. As fluid is generally dispensed from the tips of bristles, such a hairbrush design effectively delivers fluid or water to a user's scalp rather than through the user's hair.

5           While the prior art devices discussed above may provide a user with some  
functionality with respect to styling hair, such devices do not permit a user to automatically  
and/or continuously apply a fluid or water spray or mist to their hair, while simultaneously  
brushing their hair. Thus, it is desirable to have a fluid dispensing device configured as a  
brush to permit a user to apply a fluid spray or mist to his/her hair during brushing. In  
10       addition, it is desirable that such a fluid dispensing device provides a substantially  
moderate and relatively even distribution of fluid or water throughout hair while it is being  
brushed.

#### SUMMARY OF THE INVENTION

15           In an aspect of the invention, a fluid dispensing brush comprises a body defining a  
first chamber and a second chamber, the body having a plurality of openings defined in at  
least a portion of its outer surface in fluid communication with the first chamber and a  
plurality of bristles projecting therefrom. The dispensing brush further comprises a fluid  
assembly contained in the second chamber, the fluid assembly having an enclosed  
20       pressurized reservoir configured to maintain a quantity of fluid under pressure and further  
having an actuator disposed and configured to discharge a volume of pressure from the  
pressurized reservoir when actuated such that a volume of fluid is discharged from the  
pressurized reservoir. The brush also comprises a nozzle contained in the first chamber,  
the nozzle having one or more holes defined in at least a portion of its outer surface in fluid  
25       communication with the first chamber, the nozzle being configured and connected to the  
pressurized reservoir such that the nozzle receives at least a portion of the volume of fluid  
discharged from the pressurized reservoir and the one or more holes discharge the volume

5 of fluid into the first chamber as one of a fluid spray and a fluid mist, wherein the plurality of openings vents the fluid from the brush.

Implementations of the invention may include one or more of the following features. The body of the brush includes a barrel portion defining the first chamber and a handle portion defining the second chamber. The actuator includes a valve operatively  
10 connected to a first end of the pressurized reservoir and configured to discharge pressure from the pressurized reservoir when actuated. The brush further includes a switch disposed in the outer surface; the switch being further disposed and configured to couple with the valve such that movement of the switch from a first position to a second position actuates the valve. The switch is disposed in the outer surface along the handle portion.  
15 Movement of the switch from the first position to the second position includes depressing the switch. The pressurized reservoir further includes a pressurized gas cartridge configured to contain a compressed gas and operatively connected to the pressurized reservoir such that an interior of the gas cartridge is in fluid communication with an interior of the pressurized reservoir. The pressurized gas cartridge is disposed and  
20 configured to release a volume of compressed gas into the interior of the pressurized reservoir. The compressed gas can include compressed air, compressed N<sub>2</sub>O or compressed CO<sub>2</sub>.

Implementations of the invention may further include one or more of the following features. Each hole of the nozzle is sized and configured, and wherein the actuator is  
25 further configured to discharge the volume of pressure with sufficient force, such that the nozzle discharges the fluid volume of fluid as one of fine fluid droplets and ultra-fine fluid droplets. Each hole has a span ranging from about 0.4 mm to about 1.0 mm. Each hole of

5 the nozzle is sized and configured, and wherein the actuator is further configured to discharge the volume of pressure with sufficient force, such that the nozzle discharges the volume of fluid as one of an atomized spray and an atomized fluid mist. The nozzle can further include a hollow elongated tube configured to extend from the first chamber into the second chamber, and further configured to place an interior of the nozzle in fluid  
10 communication with the interior of the pressurized reservoir.

Other embodiments of the invention may include the barrel portion and the handle portion configured such that the barrel portion is removably connected to the handle portion. The barrel portion can define a circular cylinder, and the handle portion can define a circular cylinder. The plurality of bristles can be distributed along the outer  
15 surface of the cylinder such that the plurality of bristles defines a round brush. The plurality of openings can be distributed along the outer surface of the cylinder such that the fluid vents from a circumferential perimeter of the circular cylinder. In another embodiment, the barrel portion can define a paddle-shaped conformation having a first side and a second side, wherein the plurality of bristles and the plurality of openings are  
20 disposed along at least a portion of the first side.

In another aspect of the invention, a fluid dispensing brush comprises a body defining a chamber, the body having a plurality of openings defined in at least a portion of its outer surface in fluid communication with the chamber and a plurality of bristles projecting therefrom; a fluid assembly contained in a first portion of the chamber, the fluid  
25 assembly having an enclosed pressurized reservoir configured to maintain a quantity of fluid under pressure and further having an actuator disposed and configured to discharge a volume of pressure from the pressurized reservoir when actuated such that a volume of

5 fluid is discharged from the pressurized reservoir; and a nozzle contained in a second  
portion of the chamber, the nozzle having one or more holes defined in at least a portion of  
its outer surface in fluid communication with the chamber, the nozzle being configured and  
connected to the pressurized reservoir such that the nozzle receives at least a portion of the  
volume of fluid discharged from the pressurized reservoir and the one or more holes  
10 discharges the volume of fluid into the chamber as one of a fluid spray and a fluid mist,  
wherein the plurality of openings vents the fluid from the brush.

In still another aspect of the invention, a fluid dispensing brush comprises a body  
defining a chamber; at least a portion of an outer surface of the body defining a plurality of  
openings in fluid communication with the chamber and having a plurality of bristles  
15 projecting therefrom; means contained by the body within the chamber to contain and to  
maintain a quantity of fluid under pressure; means contained by the body within the  
chamber to discharge a volume of pressurized fluid; and means contained by the body  
within the chamber to receive the volume of fluid discharged and to vent the volume of  
fluid through the plurality of openings.

20 Implementations of the invention may further include one or more of the following  
features. Means to contain and to maintain the quantity of fluid under pressure includes an  
enclosed reservoir configured to contain the quantity of fluid and a compressed gas  
cartridge operatively connected to the enclosed reservoir such that an interior of the  
compressed gas cartridge is in fluid communication with an interior of the enclosed  
25 reservoir. The compressed gas cartridge can be configured to contain a quantity of  
compressed gas and further configured to release a volume of the compressed gas into the  
interior of the enclosed reservoir to maintain the quantity of fluid contained therein under



5 pressure. Means to discharge the volume of pressurized fluid includes a valve disposed and configured such that when the valve is actuated the volume of pressurized fluid is released. The valve can be further disposed and further configured to mate with a switch disposed along the outer surface such that movement of the switch from a first position to a second position actuates the valve. Means to receive the volume of fluid discharged and to  
10 vent the volume of fluid through the plurality of openings includes a nozzle disposed in the chamber having one or more holes defined in its outer surface in fluid communication with the plurality of openings. Each hole can be disposed and configured to discharge the volume of fluid as one of a fluid spray and a fluid mist.

Various aspects of the invention may provide one or more of the following  
15 advantages. Improved styling capability of a traditional hairbrush can be provided and can be incorporated with a variety of hairbrush styles and designs. Fluids and/or fluid sprays or mists can be dispensed from a brush and applied throughout a user's hair in a continuous and/or intermittent manner during a hair drying, styling and/or brushing process, and can be directed to areas of a user's hair that require fluid. Fluids and/or fluid  
20 sprays or mists can be applied to a user's hair as a spray or mist of fine or ultra-fine fluid droplets, or as an atomized fluid spray or mist. Application of a fluid to a user's hair as a fluid spray or mist helps to minimize/reduce an application of fluid as a heavy fluid stream. Fluids and/or fluid sprays or mists can be dispensed from a brush and applied to a user's hair when the user styles his/her hair with the brush to achieve a substantially moderate  
25 and relatively even distribution of fluid throughout the user's hair. A fluid can be dispensed from a brush and applied to a surface or substrate, e.g., hair, in a desired spray or mist pattern, e.g., projecting from the brush as a substantially radially projecting 360°

5 pattern or a substantially outward projecting pattern, to vary the extent of coverage of the  
fluid spray or mist on the surface or substrate. Application of fluids and/or fluid sprays or  
mists can be portable and repeatable, and can be done in locations without access to  
electricity. Easy assembly and disassembly of a fluid dispensing brush can be provided to  
refill or replace one or more components of the brush required to discharge and/or to apply  
10 an application of fluid or fluid spray or mist.

These and other advantages of the invention, along with the invention itself, will be  
more fully understood after a review of the following figures, and detailed description.

#### BRIEF DESCRIPTION OF THE FIGURES

15 **FIG. 1** is a perspective view of one embodiment of a fluid dispensing device  
according to the invention;

**FIG. 2** is an exploded perspective view of the device shown in **FIG. 1** illustrating a  
barrel including a plurality of bristles disengaged from a handle;

**FIG. 2A** is a partial perspective view of the device shown in **FIGS. 1-2** illustrating  
20 the barrel disengaged from the handle;

**FIG. 3** is a perspective view of the handle shown in **FIGS. 1-2** including a fluid  
misting assembly disposed therein;

**FIG. 4** is an exploded perspective view of the fluid misting assembly shown in  
**FIG. 3**;

25 **FIG. 5** is a perspective view of one embodiment of a nozzle, a dip tube and a screw  
collar of the fluid misting assembly shown in **FIGS. 3-4**;

5           **FIGS. 5A-5B** are perspective views of another embodiment of the nozzle of the fluid misting assembly shown in **FIGS. 3-4** including a dispensing valve;

**FIG. 6** is a perspective view of a fluid reservoir and a pressurized gas cartridge of the fluid misting assembly shown in **FIGS. 3-4**;

**FIG. 7** is a perspective view of another embodiment of the fluid dispensing device

10   according to the invention; and

**FIG. 8** is an exploded perspective view of the device shown in **FIG. 7** illustrating the barrel including the plurality of bristles disengaged from the handle.

#### DETAILED DESCRIPTION OF THE INVENTION

15           For purposes of illustration, embodiments of the invention will be described with reference to a hairbrush constructed and arranged to dispense a fluid spray or mist for use in brushing, drying and styling hair, as shown in **FIGS. 1-8**. Those skilled in the art will appreciate that embodiments of the invention are not limited to a hairbrush, but also may include a variety of brushes or devices for dispensing fluid designed for use in other

20   applications.

          Referring to **FIGS. 1-2**, one embodiment of the invention provides a portable, cordless fluid dispensing device **100** configured as a hairbrush. The device **100** includes a hollow barrel **104** removably connected to a hollow handle **102**. The barrel **104** defines an interior chamber **104B** and includes at least a portion of an outer surface **104A** having a

25   plurality of openings **112** and a plurality of bristles **106** disposed therein. The handle **102** is disposed at a proximal end of the barrel **104** and defines an interior chamber **102A** configured to contain a fluid misting assembly **101**, as shown in **FIG. 4**. The assembly

5     **101** is configured to dispense a fluid spray or mist from the barrel **104** when the device **100**  
is actuated. The device **100** can be configured to help to deliver a substantially moderate  
and relatively even distribution of fluid spray or mist throughout a user's hair during use of  
the device **100**. The fluid misting assembly **101** can include a nozzle **116**, a dip tube **118**, a  
screw collar **120**, an actuator switch **134**, an actuator valve **122**, an enclosed, refillable  
10     fluid reservoir **110**, and a pressurized gas cartridge **136** (not shown). The cartridge **136** is  
in fluid communication with an interior chamber defined by the reservoir **110** to pressurize  
the interior of the reservoir **110** and its fluid contents. Upon actuation of the device **100**, a  
fluid spray or mist is discharged from the reservoir **110** and dispensed from the plurality of  
openings **112** of the barrel **102**. The device **110** thereby delivers a fluid spray or mist to a  
15     user's hair during brushing and styling of the user's hair with the device **110**. Other  
embodiments are within the scope of the invention.

The barrel **104** and the handle **102** are each constructed and arranged such that the  
components can be readily engaged to form the device **100** and disengaged to separate the  
barrel **104** from the handle **102**. The barrel **104** and the handle **102** can be disengaged to  
20     provide access to elements of the fluid misting assembly **101** for various purposes  
including, for instances, refilling or replacing the reservoir **110** or checking the level of  
fluid contained within the reservoir **110**.

In one embodiment of the invention, a proximal end **113** of the barrel **104** and a  
distal end **115** of the handle **102** are constructed and arranged to removably couple and to  
25     securely connect the barrel **104** to the handle **102**. The proximal end **113** of the barrel **104**  
defines an opening **114** configured and sized to receive at least a portion of the distal end  
**115** of the handle **102**. The portion of the distal end **115** of the handle **102** can be

5 configured such that when it is inserted into the opening 114, the portion of the distal end 115 mates with an inner surface immediately adjacent to the opening 114 to removably couple the barrel 104 to the handle 102.

As shown in **FIG. 2**, in one embodiment, the portion of the distal end 115 and the inner surface adjacent to the opening 114 can be further configured to define a  
10 groove/notch-type combination that will permit the barrel 104 and the handle 102 to be removably and securely connected. For instance, the distal end 115 of the handle 102 can include one or more tabs, ribs or other protrusions 109 configured for mating with corresponding slots or grooves 111 defined in the inner surface adjacent to the opening 114. The slots or grooves 111 can be configured to receive the one or more tabs or ribs  
15 where the distal end 115 of the handle 102 and the proximal end 113 of the barrel 104 are coupled, and can be sized to insure that when coupled the tabs or ribs 109 mate with the surfaces of the slots or grooves 111 to achieve a close fit.

Where the distal end 115 of the handle 102 is inserted into the opening 114, the distal end 115 can be rotated, e.g., clockwise, until each of the one or more slots or grooves  
20 receives and mates with one of the tabs or ribs, thereby engaging the groove/notch combination and securely connecting the handle 102 to the barrel 104. Rotating the handle 102 in an opposite direction, e.g., counterclockwise, can disengage the groove/notch combination to separate the handle 102 from the barrel 104.

Referring to **FIG. 2A**, in another embodiment of the invention, the barrel 104 and  
25 the handle 102 are removably connected by a combination of one or more protruding tabs or notches 117 and one or more grooves 119. In one embodiment, the one or more protruding tabs or notches 117 are disposed along the inner surface adjacent to the opening

5     **114** defined at the proximal end of the barrel **104**. Each protruding tab or notch **117** is sized and configured such that a groove **119** defined in the portion of the distal end **115** of the handle **102** receives the tab or notch **117** when the portion of the distal end **115** is inserted into the opening **114**. As shown in **FIG. 2A**, the portion of the distal end of the handle **102** can include one or more grooves **119** to receive one or more tabs or notches  
10     **117** of the barrel **104**. In one embodiment, each groove **119** defines an L-shape such that an L-shaped groove path **121** is provided. When each tab or notch **117** is inserted into a corresponding groove **119**, the L-shaped groove **119** is sized and configured to receive the tab or notch **117** and to guide the tab or notch **117** along the groove path **121**, requiring the barrel **102** or the handle **104** to be rotated, e.g., clockwise, to permit the tab or notch **117** to  
15     be fully inserted and to mate with an end of the groove path **121**. In one embodiment, each guide path **121** further includes a groove bump **123**. The groove bump **123** provides a resistance to insertion of the tab or notch **117** along the groove path **121** and requires a user apply some manual force or pressure to overcome the groove bump **123** to fully insert and to mate the tab or notch **117** with the end of the groove path **121**. In one embodiment, the  
20     groove bump **123** is configured to help to maintain the tab or notch **117** in its position to thereby help to securely connect the barrel **104** to the handle **102**. The groove **119** configuration requires a user to rotate, e.g., counterclockwise, the barrel **104** or the handle **102** to disconnect the barrel **104** from the handle **102**. Coupling of the tabs or notches **117** and the grooves **119** thereby permits the barrel **104** and the handle **102** to be removably  
25     and securely connected.

The barrel **104** is designed and configured to define any desired or required conformation. As shown in **FIG. 1**, in one embodiment of the invention, the barrel **104**

5 defines a substantially circular cylinder, usually referred to as a “round hairbrush”, with the plurality of bristles **106** and the plurality of openings **112** distributed around the outer surface **104A** of the barrel **104**. As described below with respect to other embodiments, the invention is not limited with respect to the conformation of the barrel **104** and anticipates that the barrel **104** can define a variety of shapes and configurations. The barrel  
10 **104** conformation may be limited only by the size and the configuration of its interior chamber **104B** required to accommodate dispensing elements of the fluid misting assembly **101**.

The interior chamber **104B** of the barrel **104** is sized and configured to receive at least a portion of one or more of the dispensing elements of the fluid misting assembly  
15 **101**. In one embodiment, the chamber **104B** is sized and configured to receive and contain the nozzle **116** and a portion of the dip tube **118**. When the device **100** is actuated, a fluid is discharged from the reservoir **110** and is dispensed into the dip tube **118** and ultimately from the nozzle **116** and the openings **112** of the barrel **104**. The chamber **104B** is sized and configured to permit a fluid discharged from the nozzle **116** to permeate through the  
20 openings **112**.

The openings **112** of the barrel **104** define a vented surface along at least a portion of the outer surface **104A**. Each opening **112** is in fluid communication with the interior chamber **104B** and an area external to the barrel **104** to permit gas, e.g., air, and/or a fluid, e.g., water, to permeate or dispense from the chamber **104B**. When the device **100** is  
25 actuated, the actuator valve **122** causes a volume of pressure to discharge from the reservoir **110**, which causes a volume of fluid to discharge from the reservoir **110** into the dip tube **118** and the nozzle **116**. The nozzle **116** discharges the volume of fluid as a fluid

5 spray or mist into the chamber of the barrel **104** and from the openings **112** of the barrel **104**. In one embodiment, the openings **112** can define a repeating pattern or a random array along at least a portion of the outer surface **104A**.

As shown in **FIG. 1**, and as described above, in one embodiment, the barrel **104** can define a round hairbrush and can include the openings **112** distributed substantially  
10 around its outer surface **104A**. In this case, the openings **112** dispense a fluid spray or mist from the barrel **104** in different directions along its circumferential perimeter such that a fluid pattern radiates from the barrel **104** that substantially approaches a circular or 360° spraying or misting pattern. The distribution of the openings **112** thereby, in part, helps to dispense a substantially moderate and relatively even distribution of a fluid spray or mist  
15 throughout a user's hair when the user brushes his/her hair with the device **100**.

Similarly, in one embodiment, the plurality of bristles **106B** can define a repeating pattern or a random array along at least a portion of the outer surface **104A**. A distribution or pattern of the bristles **106** can depend, in part, on an application in which the device **100** is to be used or a desired or required aesthetic appeal or design of the device **100**.

20 Like the barrel **104**, the handle **102** is designed and configured to define any desired or required conformation. As shown in **FIG. 1**, in one embodiment, the handle **102** defines a substantially circular cylinder. The invention is not limited with respect to the conformation of the handle **102** and anticipates that the handle **104** can define a variety of shapes and configurations, and may further include a texturized outer surface or other  
25 surface conformations to help to provide a comfortable and secure manual grip of the device **100**. The handle **102** conformation may be limited only by the size and the configuration of its interior chamber **104B** that are required to accommodate the fluid



5 As shown in **FIG. 3**, when coupled, the reservoir **110** and the cartridge **136** are configured and sized such that at least a portion of the chamber **102A** of the handle **102** receives and contains these components. An inner surface of the handle **102** defining the chamber **102A** includes one or more ribs **126** configured to help to guide the insertion of the reservoir **110** and the cartridge **136** into the chamber **102A**, and to help to securely  
10 dispose the reservoir **110** and the cartridge **136** within the handle **102**. In one embodiment, the one or more ribs **126** are continuous and extend laterally around a perimeter of the inner surface of the handle **102** such that the ribs **126** define a circular, an elliptical, or a concave-shaped cross section. As shown in **FIG. 3**, in one embodiment, the handle **102** includes three ribs **126** defined by the inner surface of the chamber **102A** to help to  
15 securely dispose the cartridge **136** within the chamber **102A**, which, in effect, helps to securely dispose the reservoir **110** within the chamber **102A**.

As shown in **FIG. 4**, in one embodiment, the inner surface of the chamber **102A** can further include one or more protruding tabs **126A** disposed and configured to couple with the proximal end of the reservoir **110**. The tabs **126A** are defined in the inner surface  
20 such that when the reservoir **110** is disposed within the chamber **102A**, the proximal end of the reservoir **110** mates with at least a portion of each of the protruding tabs **126A** and is thereby positioned within the chamber **102A** to receive the cartridge **136**.

As shown in **FIG. 4**, in one embodiment, the inner surface of the chamber **102A** defines an additional rib **128** at the distal end **115** of the handle **102** to help to position and  
25 to securely maintain the reservoir **110** in its position within the chamber **102A**. The ribs **126**, **128**, in particular, help to securely maintain the reservoir **110** and the cartridge **136** in position within the chamber **102A**, for instance, during pressurization of the reservoir **110**

5 interior by the cartridge 136, and during refill of the reservoir 110 at the distal end 115 of the handle 102.

With further reference to **FIG. 3**, in one embodiment of the invention, the reservoir 110 is joined to a portion of the inner surface of the chamber 102A of the handle 102 and/or to one or more of the ribs 126, 128 such that the reservoir 110 is not removable  
10 from the handle 102.

Referring to **FIG. 5**, and with further reference to **FIGS. 3-4**, the nozzle 116 is disposed at the distal end of the dip tube 118. When the device 100 is assembled, the dip tube 118 extends into the interior chamber 104B of the barrel 102 such that at least a portion of the dip tube 118 and the nozzle 116 are disposed therein. The nozzle 116 is  
15 further disposed and configured to emit or discharge fluid as a fluid spray or mist, e.g., a spray or mist consisting of fine or ultra-fine droplets or an atomized fluid spray or mist. The nozzle 116 discharges the fluid spray or mist into the chamber 102A and through the plurality of openings 122 of the barrel 104, and ultimately to a user's hair.

In one embodiment, the nozzle 116 is configured to emit or discharge a fluid spray  
20 or mist, e.g., in a substantially circular-like pattern or in a pattern that radiates from the nozzle 116 at about 360° along its perimeter. In one embodiment, the nozzle 116 is configured as a substantially circular-shaped, disk-like element 116 that defines a plurality of holes 190 in an outer perimeter or a circumferential edge of the nozzle 116. The distribution of the holes 190 helps to discharge a fluid spray or mist as a pattern  
25 substantially radiating at about 360° from the nozzle 116. Embodiments of the invention in which the barrel 104 is a round cylinder and the openings 112 are defined and distributed around the barrel 104, the openings 112 would dispense a fluid spray or mist in

5 substantially a number of directions or angles from the round-shaped barrel **104** in a pattern substantially radiating at about 360°. In one embodiment, the circular-shaped nozzle **116** further defines one or more additional holes **190A** in a first outer surface of the nozzle **116** opposite to a second outer surface that couples to the dip tube **118**.

Each hole **190, 190A** is sized and configured to affect a volume of fluid the nozzle  
10 **116** discharges. In one embodiment, the holes **190, 190A** are sized and configured to help to prevent/minimize discharge of a fluid from the nozzle **116** as a heavy stream or pattern of fluid. In one embodiment, the holes **190, 190A** have very small spans or narrow diameters to help to increase/maximize the extent fluid is discharged as a spray or mist and/or to help to increase/maximize the extent fluid is atomization when forced through  
15 and discharged from each hole **190, 190A**. In one embodiment, each hole **190, 190A** can define a span or diameter of from about 0.4 mm to about 1.0 mm. In addition, the number and/or the distribution of the holes **190, 190A** can help to increase/maximize the extent of fluid atomization.

Referring to **FIGS. 5A-5B**, in another embodiment of the invention, the nozzle **116**  
20 is configured and arranged such that turning the nozzle **116** in a bi-directional orientation, as shown by arrow **150** in **FIG. 5B**, helps to adjust, e.g., increase or decrease, a size of an opening **140** defined in the nozzle **116**. Adjusting the size of the opening **140** thereby helps to adjust a volume of fluid discharged and/or helps to discharge fluid as a spray, a mist or an atomized spray or mist. In this case, the nozzle **116** provides a dispensing valve  
25 **142** coupled with the opening **140**. The dispensing valve **142** and the opening **140** are disposed in fluid communication with the dip tube **118** and are configured to dispense fluid from the nozzle **116**. As shown in **FIG. 5A**, in one embodiment, the dispensing valve **142**

5 and the opening 140 are disposed in the first outer surface of the nozzle 116 opposite to its second surface coupled with the dip tube 118. As shown in **FIG. 5B**, in one embodiment, the dispensing valve 142 and the opening 140 are disposed in fluid communication with the dip tube 118 via a dip tube extension 118A, e.g., an elongate or tapered portion of the distal end of the dip tube 118 configured such that the dispensing valve 142 couples or  
10 receives the extension 118A.

When the nozzle 116 is turned in a bi-directional orientation, as shown by arrow 150 in **FIG. 5B**, the dispensing valve 142 actuates to adjust, e.g., increase or decrease, a size of the opening 140 and thereby to adjust a volume and/or nature of fluid discharged from the nozzle 116. In one embodiment, the dispensing valve 142 is configured and  
15 arranged to dispense fluid as a spray, a mist or an atomized spray or mist. In one embodiment, the dispensing valve 142 is configured and arranged to define the opening 140 with a span or diameter ranging from about 0.4 mm to about 1.0 mm. In another embodiment, the dispensing valve 142 is further configured and arranged to permit the nozzle 116 to be turned such that the dispensing valve 142 closes the opening 140  
20 substantially completely to prevent fluid discharge. The invention anticipates that the dispensing valve 142 may be any type of valve known in the art suitable for use with the nozzle 116 and for increasing and decreasing a span or diameter of the opening 140 to affect a volume and extent of atomization of a fluid discharged from the nozzle 116, and/or to substantially completely open and close the opening 140 of the nozzle 116.

25 As shown in **FIG. 5B**, in one embodiment, the nozzle 116 further includes a plurality of ridges 144 defined along at least a portion of its outer perimeter surface to

5 provide a user grip to help a user to turn the nozzle 116 to adjust a volume and nature of fluid discharged from the nozzle 116.

Referring further to **FIGS. 3-5**, the dip tube 118 is an elongated, hollow member coupled to a distal end of the reservoir 110. A portion of the dip tube 118 inserts through an opening of the actuator valve 122 disposed at the distal end of the reservoir 110 in fluid  
10 communication with the interior of the reservoir 110. The dip tube 118 extends into the interior of the reservoir 110 at a length sufficient such that the dip tube 118 is in communication with the fluid contents of the reservoir 110 and positioned at a depth sufficient to receive a volume of fluid discharged from the pressurized reservoir 110 interior when the device 100 is actuated.

15 The dip tube 118 is removably coupled and securely connected to the reservoir 110 by a screw collar 120. The collar 120 is disposed at a position along the dip tube 118 such that when the collar 120 is coupled with the distal end of the reservoir 110 and the dip tube 118 is inserted into the reservoir 110 interior, an optimal length of the dip tube 118 extends into the reservoir 110, as described above.

20 The collar 120 couples with the distal end of the reservoir 110 by sets of corresponding threads disposed along the collar 120 and at the distal end of the reservoir 110. As shown in **FIG. 5**, a first set of threads 180 is defined along an inner surface of the collar 120 at its proximal end that are configured and sized to couple with and connect to a second set of threads 184 defined at the distal end of the reservoir 110. The collar 120 is  
25 positioned over the distal end of the reservoir 110 and the first and the second set of threads 180, 184 mate when the collar 120 is rotated along the second set of threads 184, thereby removably and securely connecting the dip tube 118 to the reservoir 110. The

5 collar **122** and its position along the dip tube **118** help to insure that the length of the portion of the dip tube **118** extending into the reservoir **110** is sufficient for the dip tube **118** to contact the fluid contents of the reservoir **110** and to receive a volume of fluid discharged from the reservoir **110**.

In one embodiment, the dip tube **118** and the collar **122** are constructed as a single  
10 unit. The dip tube **118** and the collar **122**, in this case, are constructed of a material suitable for use in moist and wet conditions and to withstand a degree of wear and tear as a consequence of, for instance, engaging and disengaging the fluid misting assembly **101** from the handle **102**. A suitable material includes, but is not limited to, plastic, whereby a plastic molding or injection-molding method or process well known in the art can be used  
15 to form the dip tube **118** and the collar **122**. As a single unit, the depth of the dip tube **118** extending into the interior of the reservoir **110** is substantially insured.

A ring **186** is disposed along the dip tube **118** below the collar **120**. When the dip tube **118** is connected to the reservoir **110**, the ring **186** helps to permit the dip tube **118** to extend into the reservoir **110** at a depth sufficient to help the dip tube **118** receive a volume  
20 of fluid discharged from the pressurized interior of the reservoir **110** upon actuation of the device **100**, as noted above. The ring **186** is sized and configured such that it mates along the distal end of the reservoir **110**.

In addition, the collar **120** can further include a washer or an O-ring (not shown) disposed along an inner surface of the collar **120** at its distal end to help to provide a seal  
25 that helps to minimize/reduce a loss of pressure and/or gas from the reservoir **110** during the pressurization of the reservoir **110** interior. Alternatively, the ring **186** can be

5 constructed of a material suitable for providing sealing properties similar to a washer or an O-ring.

The collar **120** can further include one or more ribs **182** defined in its outer surface and extending vertically along the outer surface to help to serve as a manual grip for a user. The ribs **182** can further help a user engage and disengage the dip tube **118** from the  
10 reservoir **110**, for instances, to refill or to replace the reservoir **110**.

With further reference to **FIGS. 3-4**, the switch **134** is disposed along and mounted in an outer surface of the handle **104**. In one embodiment, the switch **134** is disposed posterior to the actuator valve **122**. The switch **134** is disposed and configured to select and to actuate one or more operation settings or functions of the device **100**. In one  
15 embodiment, the switch **134** is further disposed in the outer surface of the handle **104** such that the switch **134** is positioned over or in alignment with at least a portion of an actuator conduit **148** disposed within the interior of the handle **102**. As shown in **FIG. 3**, the actuator conduit **148** is configured to contact or to couple with the actuator valve **122** and to extend from the distal end of the reservoir **110** into the chamber **102A** of the handle **102**,  
20 e.g., to be disposed along an outer surface of the reservoir **110**.

In one embodiment, when the switch **134** is actuated, the switch **134** contacts the actuator conduit **148**, which in turn contacts and actuates the actuator valve **122**. When engaged, the actuator valve **122** causes a discharge of fluid from the pressurized reservoir **110**, and when disengaged the valve **122** does not cause a fluid discharge. In one  
25 embodiment, the switch **134** is configured such that manually actuating, e.g., depressing or shifting, the switch **134** causes the switch **134** to contact the actuator conduit **148** and to depress or shift the actuator conduit **148** into an actuated position. When the actuator

5 conduit 148 is depressed or shifted into an actuated position, the movement of the actuator  
conduit 148 to such a position causes the actuator valve 122 to become actuated, e.g.,  
depressed or shifted. The actuation, or the depressing or shifting movement, of the  
actuator valve 122 causes a release or discharge of a volume of pressure from the  
pressurized interior of the reservoir 110 and a resultant simultaneous discharge of a volume  
10 of its fluid contents into the dip tube 118 and from the nozzle 116. Fluid is dispensed from  
the reservoir 110 with a dispensing force sufficient to help to dispense the fluid through the  
nozzle 116 and the openings 112 as a fluid spray or mist, e.g., of fine or ultra fine droplets  
or as an atomized fluid spray or mist. The dispensing force is a consequence of the  
pressurized state of the interior of the reservoir 100 just before the actuator valve 122  
15 actuates release pressure and fluid from the reservoir 110.

The switch 134 is disposed and configured such that manually actuating, e.g.,  
depressing or shifting, the switch 134 a certain number of times and/or in a certain  
direction causes the device 100 to be in one or more operation settings or functions, such  
as, for instance, an “ON” setting, an “OFF” setting and/or a “MIST” setting.

20 In one embodiment, the switch 134 is disposed and configured such that when a  
user manually depresses the switch 134 continuously the device 100 dispenses a  
continuous fluid spray or mist from the barrel 104. In one embodiment, the switch 134 is  
disposed and configured such that when the switch 134 is depressed manually, the switch  
134 remains depressed, which essentially places the device 100 in a “MIST” setting  
25 whereby the device 100 dispenses a fluid spray or mist continuously, until such time as the  
switch 134 is depressed a second time to release the switch 134 and to place the device 100  
in an “OFF” setting to discontinue dispensing. In another embodiment, the switch 134 is



5 disposed and configured such that depressing the switch 134 intermittently causes the device 100 to intermittently discharge a fluid spray or mist. The invention anticipates that the switch 134 can be disposed and configured such that shifting the switch 134, rather than depressing the switch 134, from a first to a second position and/or from a second to a first position can place the device 100 in similar operation settings to actuate misting  
10 functions as described above.

In another embodiment of the invention, the switch 134 is disposed and configured such that when the switch 134 is shifted from a first “OFF” position to a second “ON” position, the switch 134 is positioned such that when the switch 134 is manually depressed, the switch 134 places the device 100 in a “MIST” setting and causes the device 100 to  
15 dispense continuously and/or intermittently a fluid spray or mist.

The invention is not limited to the configuration of the switch 134 nor to the arrangement of the switch 134 and the actuating conduit 148 as described above for actuating one or more settings or functions of the device 100, and anticipates that the switch 134, the actuating conduit 148 and/or other actuating mechanisms can be  
20 incorporated into the device 100 and/or the assembly 101 to provide the necessary or desired fluid dispensing operation settings to meet a required or preferred mode of dispensing a fluid spray or mist from the device 100.

As noted above, and with further reference to **FIGS. 3-4**, the reservoir 110 is disposed in the chamber 102A of the handle 102 anterior to the gas cartridge 136 and is  
25 connected to the dip tube 118 via the collar 120. The collar 120 helps to position and to stabilize the reservoir 110 within the chamber 102A during pressurization of the reservoir

5     **110.** The reservoir **110** defines an interior sized and configured to contain a required or desired volume of fluid.

          The reservoir **110** is disposed and configured such that to inspect or to refill the reservoir **110**, the barrel **102** need only be disengaged from the handle **102** and the collar **120** and the dip tube **118** disconnected and removed from the distal end of the reservoir

10     **110.** In one embodiment, at least a portion of a side wall of the reservoir **110** is constructed of a clear material suitable for providing a visual inspection of the reservoir **110** interior. In one embodiment, the portion of the side wall of the reservoir **110** is constructed of a clear material including, but not limited to, a translucent/transparent polycarbonate or plastic to permit visual inspection of the reservoir **110** interior and, in  
15     particular, to permit visual inspection of a level of the fluid contents contained within the reservoir **110**. In one embodiment, the reservoir **110** can be entirely constructed of a translucent/transparent polycarbonate or plastic.

          As shown in **FIG. 1**, in one embodiment, a portion of a side wall of the handle **102** is configured as a window-like structure **102B** and is constructed of a clear material, such  
20     as those materials noted above. The clear window-like structure **102B** is disposed and configured in the side wall of the handle **102** such that the structure **102B** is positioned adjacent to and substantially aligned with the clear portion of the reservoir **110** to permit visual inspection of the reservoir **110** interior and the level of its fluid contents without disengaging the barrel **104** from the handle **102** and disconnecting the collar **120** and the  
25     dip tube **118** from the reservoir **110**. During use, the “clear” portion of the reservoir **110** and window-like structure **102B** permit a user to visually and conveniently inspect a fluid level of the reservoir **110** without disassembling the device **100**.

5 Still referring to **FIGS. 3-4**, the pressurized gas cartridge **136** is disposed within the chamber **102A** of the handle **102** posterior to the reservoir **110**. The cartridge **136** is configured to contain a volume of compressed gas and is further configured to discharge a volume of compressed gas when its interior is accessed. The cartridge **136** can include, but is not limited to, a compressed air, N<sub>2</sub>O or CO<sub>2</sub>-filled cartridge. The cartridge **136** is  
10 portable and can range in volume of from about 5 grams to about 25 grams. The size (volume) of the cartridge **136** is only limited to accommodate a size of the chamber **102A** and the handle **102**, and a practical size of the hairbrush device **100**.

Referring to **FIG. 6**, and with further reference to **FIG. 4**, the handle **102** and its interior components are assembled in part by insertion of the cartridge **136** into the  
15 chamber **102A** of the handle **102**. The cartridge **136** includes a size and shape for insertion of the cartridge **136** into the proximal end of the handle **102**. When the cartridge **136** is inserted into the chamber **102A**, the cartridge **136** is coupled to the proximal end of the reservoir **110**. With assistance provided by an outer intake valve guide **138** and an inner intake valve guide **174**, each defined in the proximal end of the reservoir **110** and  
20 configured to help to guide and position the cartridge **136**, the inner and the outer intake valve guides **138**, **174** help to removably couple and to securely connect the cartridge **136** to the reservoir **110** to thereby insure a proper connection between the cartridge **136** and the reservoir **110**.

With further reference to **FIG. 4**, a cap **130**, configured to couple with the proximal  
25 end of the handle **102**, defines a set of threads along its interior surface that couple and mate with a corresponding set of threads defined in the handle **102** adjacent to its proximal end. When the cap **130** couples with the proximal end of the handle **102** and is rotated in

5 one direction, such rotating motion causes the sets of threads to mate, thereby connecting the cap 130 to the handle 102.

The rotating motion of the cap 130 effectively tightens the cap 130 to the handle 102, while simultaneously forcing the cartridge 136 forward toward the proximal end of the reservoir 110, as shown by arrow 300 in FIG. 6. A spring 162 disposed in an inner  
10 surface of the cap 130 is configured to bias against the cartridge 136 and to help the cartridge 136 advance forward when the cap 130 is coupled to the handle 102 and is rotated to secure the cap 130 thereon. The spring 162 is further disposed and configured to be removed from the cap 130 and replaced with a spring having a different size such that the cap 130 and the spring 162 combination accommodate different sizes of cartridges 136.

15 Once inserted into the chamber 102A of the handle 102, the rotating motion of the cap 130 forces the cartridge 136 forward toward and into the outer and the inner intake valve guides 138, 174 whereby it couples with the guides 138, 174 and the proximal end of the reservoir 110. The cartridge 136 initially engages the outer guide and then the inner guide 174, which is defined by a perimeter of the outer guide 138. As shown in FIG. 6, in  
20 one embodiment, the inner and the outer intake valve guides 138, 174 define substantially circular guides wherein the inner guide 174 is disposed within the outer guide 138, and each guide 138, 174 accommodates a distal portion of the cartridge 136. The rotating motion of the cap 130 and the guidance of the outer and the inner guides 138, 174 help to position the distal end of the cartridge 136 substantially over a flexible membrane 172  
25 disposed within the inner guide 174.

The distal end of the cartridge 136 is further configured as a tapered end 137. In one embodiment, a dam-like membrane (not shown) is disposed within the distal end of the

5 cartridge 136 or within the tapered end 137 such that, when the cartridge 136 is coupled to the proximal end of the reservoir 110, as described below, the membrane is broken to place an interior of the cartridge 136 in fluid communication with the reservoir 110 interior. The membrane can be constructed of any material suitable for piercing including, but not limited to, metal.

10 When coupled to the proximal end of the reservoir 110, the cartridge 136 is disposed over the membrane 172. Once the cartridge 136 is positioned over the membrane 172, additional rotation of the cap 130 causes the tapered end 137 to move forward to contact a piercing element 170, e.g., an intake valve, disposed along, e.g., a center, of the membrane 172. The piercing element or intake valve 170 is disposed and configured to  
15 receive the tapered end 137. When the valve 170 receives the tapered end 137 as a result of the forward movement, the valve 170 pierces the dam-like membrane of the cartridge 136. The intake valve 170 and the tapered end 137 are thereby connected. The valve 170 and the tapered end 137 effectively place the interior of the cartridge 136 in fluid communication with the interior of the reservoir 110. Pressurized gas contained within the  
20 cartridge 136 can discharge from the cartridge 136 into the reservoir 110 interior to thereby pressurize the interior and the fluid contents contained therein. As long as the cartridge 136 contains a pressurized (compressed) gas, and remains connected to the reservoir 110 and in fluid communication with its interior, the reservoir 110 interior and its fluid contents remain pressurized. Actuating the switch 134, as noted above, effectively actuates the  
25 actuator valve 122, which causes a release of pressure from the pressurized reservoir 110 interior and a consequence discharge of a volume of fluid therefrom.

5           With further reference to **FIGS. 1-2**, the barrel **104** and the handle **102** may be constructed of a material suitable for permitting the device **100** to be easily manipulated manually and for withstanding moist and wet conditions. A suitable material is lightweight and does not add significant weight to the device **100**, thereby permitting the device **100** to be portable and easily transported. A suitable material provides sufficient  
10 strength such that the material can withstand wear and tear of such operations as engaging and disengaging the barrel **104** and the handle **102**. In particular, portions of the barrel **104** and the handle **102** defining the chambers **104B** and **102A**, as well as the cap **130**, that are configured to position the reservoir **110** and the cartridge **136** within the device **100** are constructed of such a material suitable for withstanding moist and wet conditions and wear  
15 and tear associated with assembly and disassembly of the device **100**. In addition, one or more components of the fluid misting assembly **101** can be constructed of a material suitable for providing those physical properties and characteristics described above. The outer and the inner intake valve guides **138**, **174** are constructed of a material suitable for withstanding the engagement and disengagement of the cartridge **136** to the reservoir **110**.  
20 Also, the nozzle **116**, the dip tube **118** and the collar **120** can be similarly constructed of such a material suitable for providing such properties noted. A suitable material includes, but is not limited to, rubber, plastic, metal, wood or a combination thereof.

Referring to **FIGS. 7-8**, another embodiment of the invention provides a portable, cordless pressurized fluid dispensing device **200** configured as a hairbrush and including  
25 those elements and components described above with reference to the device **100** and **FIGS. 1-6**. As shown in **FIG. 7**, the device **200** includes the barrel **104** configured in a paddle-like conformation. In this embodiment, the paddle-like barrel **104** has a first outer

5 surface **204** and a second outer surface **205** (not shown). The first outer surface **204** defines a dispensing opening **224** in fluid communication with the chamber **104B** of the barrel **104** and further provides the plurality of bristles **106** projecting therefrom.

The proximal end **113** of the paddle-like barrel **104** is similarly constructed to that of the device **100** shown in **FIGS. 1-2**, and includes an opening **114** and one or more  
10 notches **206** defined along a portion of an inner surface of the barrel chamber **104B**. The one or more notches **206** are disposed and configured to couple with one or more corresponding notches **208** defined along a surface of the distal end **115** of the handle **104**. The notches **206** of the barrel **104** and the notches **208** of the handle **102** are disposed and configured such that each notch **206**, **208** inserts into an area defined by adjacent pairs of  
15 notches **206**, **208**. In other words, adjacent pairs of notches **206**, **208** define an area sized and configured to receive one of the opposing corresponding notches **206**, **208**.

Where the fluid misting assembly **101** is substantially assembled and the barrel **104** and the handle **102** are engaged, the nozzle **116** is disposed within the chamber **104B** of the barrel **104** such that it is substantially adjacent to and aligned with the dispensing  
20 opening **224** in the outer surface **104A** of the barrel **104**. In one embodiment, the dispensing opening **224** is sized and configured to receive the nozzle **116**. The nozzle **116** is correspondingly configured and disposed in the chamber **104B** such that the dispensing opening **224** receives the nozzle **116** when the nozzle **116** is connected to the reservoir **110**, e.g., via the dip tube **118**. In this configuration the nozzle **116** dispenses a fluid spray or  
25 mist through the dispensing opening **224**.

Other embodiments are within the scope and spirit of the invention. For example, the device **100**, **200**, with or without the plurality of bristles **112**, can be configured as a

5 kitchen utensil, such as a cooking oil/melted butter dispensing pastry brush or a cooking oil/melted butter-basting device. The device **100, 200** can be further configured, for example, as a hardware device, such as a paint-dispensing device. In these cases, the reservoir **110** size can be adjusted to accommodate, if necessary, a larger volume of fluid for dispensing, as well as the size of the cartridge **136** to provide sufficient compressed gas  
10 to pressurize and discharge a larger volume of fluid. In addition, the openings **112, 224**, the nozzle **116** and the dip tube **118** can be sized and configured appropriately to accommodate such viscous fluids as cooking oil, melted butter and paint, and to allow such fluids to pass through these components and to be delivered as a fluid spray or mist from the device **100, 200**.

15 Other embodiments can include, for example, the device **100, 200** configured for incorporation with or configured as a children's water-squirting toy, a personal device, e.g., a portable water misting/cooling fan, or as another personal grooming device, e.g., a fragrance dispenser, to dispense a cosmetic fluid as a mist.

Having thus described at least one illustrative embodiment of the invention, various  
20 alterations, modifications and improvements will readily occur to those skilled in the art. Such alterations, modifications and improvements are intended to be within the scope and spirit of the invention. Accordingly, the foregoing description is by way of example only and is not intended as limiting. The invention's limit is defined only in the following claims and the equivalents thereto.

25 What is claimed is: